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Investigation of Phase Formation Processes in Nitrogen Implanted Iron-carbonaceous Alloys

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Abstract

The commercial alloys of Fe-C-Si system (3,35-3,65 mass % C, 1,5-2,2 mass % Si, <1 mass % Mn, Cr, P, S) are studied concerning with N+ ion implantation. Structure and phase changes in the implanted surfaces are identified by Mossbauer spectroscopy. Free C of graphite inclusions promotes the formation of nitride and carbide phases in the implanted layer. The alloy microhardness increase is attributed to accelerated diffusion of point defects under irradiation and by dislocation displacement deep into the sample.